In the Claims

1. (Previously Presented) A method comprising:

determining randomly distributed features in an object;

determining a probability density function associated with the object;

compressing data representing the randomly distributed features, wherein the compressing is based in part on the probability density function;

encoding the compressed data with a signature; and

creating a label comprising the object and the encoded data.

2. (Currently Amended) The method as recited in Claim 1, wherein compressing the data additionally comprises:

determining vectors associated with the randomly distributed features based, at least in part, on the probability density function; and

encoding the vectors using an arithmetic coding ~~algorithm.~~ algorithm, wherein the algorithm comprises:

set U as a list of all unit areas in $S - S_i - u$.

list of all marked units, $M(u)$, is set to $M(u) = \varnothing$.

do

find all unit areas $V = \text{argmin}_{v \subset U} \| Q_v - Q_u \|$.

do

find unit area $w = \text{argmax}_{v \in V} \xi(1, v)$.

set AC range for w to $\gamma(w,u)$ (see Eqns.17,18).

set of nodes ordered before w is $M_w(u) = M(u)$.

$M(u) = M(u) \cup w$, $V = V - w$, $U = U - w$.

while $V \neq \varnothing$

while $U \neq \varnothing$.

3. (Original) The method as recited in Claim 2, wherein encoding the vectors using the arithmetic coding algorithm includes determining a path for connecting a portion of the vectors within a fixed amount of data.

4. (Original) The method as recited in Claim 2, wherein the randomly distributed features are fibers that are randomly positioned in the object.

5. (Original) The method as recited in Claim 4, wherein the probability density function represents a probability that fibers in the particular region are illuminated by a light source.

6. (Original) The method as recited in Claim 4, wherein the probability density function is derived based, at least in part, on the length of the fibers.

7. (Original) The method as recited in Claim 4, wherein each vector represents the end points of two fibers.

8. (Original) The method as recited in Claim 1, wherein the data is encoded with a private key.

9. (Original) The method as recited in Claim 1, wherein the label is a certificate of authenticity configured to be self-authenticated and wherein the object is an authentication object included in the certificate of authenticity.

10. (Original) The method as recited in Claim 1, wherein the encoded data is included in the label as a barcode.

11. (Original) The method as recited in Claim 1, further comprising:

determining textual data that includes a string of characters;

hashing the textual data with an algorithm;

encrypting the compressed data using the hashed textual data; and

including the textual data in the label.

12. (Original) The method as recited in Claim 11, wherein the algorithm is a cryptographically secure hash algorithm.

13. (Original) The method as recited in Claim 11, wherein the algorithm is an SHA1 cryptographical algorithm.

14. (Original) One or more computer-readable memories containing instructions that are executable by a processor to perform the method recited in Claim 1.

15. (Currently Amended) A system comprising

an issuer configured to determine randomly distributed features in an authentication object and to compress data representing the randomly distributed features comprising fibers, the issuer being further configured to encode the compressed data with a signature and to create a label that includes the authentication object and the encoded data;

wherein the issuer is further configured to determine a probability density function associated with the authentication object, wherein the probability density function is defined as the likelihood of finding a second end of a fiber at a given location within a non-illuminated area when a first end of the fiber is located within an illuminated area of the authentication object, to determine vectors associated with the randomly distributed attributes based, at least in part, on the probability density function, and to encode a portion of the vectors as a path by applying an arithmetic coding algorithm.

16. (Cancel)

17. (Currently Amended) The system as recited in Claim 15, wherein ~~the issuer is further configured to encode the compressed data with a private key~~ the probability density function utilizes a perimeter containment function.

18. (Currently Amended) The system as recited in Claim [[15]]17, wherein the perimeter containment function assumes that the first end of the fiber can be located anywhere within the authentication object and that the second end

of the fiber will be in a location dependent on a location of the first end of the fiber ~~issuer is further configured to include a barcode with the encoded data in the label~~.

19. (Currently Amended) The system as recited in Claim [[15]]17, wherein the ~~issuer is further configured to determine textual data that includes a string of characters and to hash the textual data with an algorithm~~ perimeter containment function comprises different instances, depending on intersection of a perimeter with edges of the authentication object.

20. (Currently Amended) The system as recited in Claim [[19]]15, wherein the ~~issuer is further configured to encrypt the compressed data using the hashed textual data and to include the textual data in the label~~ determined vectors are encoded using a near-minimal number of bits type algorithm.

21. (Original) The system as recited in Claim 15, further comprising:

a verifier configured to decode the data representing the randomly distributed features in the label and to authenticate the label by comparing the decoded data with the data of the actual randomly distributed features determined from the authentication object.

22. (Currently Amended) A label comprising:

an authentication object including randomly distributed features; and

encoded information associated with the authentication object, the information being encoded with a signature and including compressed data representing the randomly distributed features in the authentication object, wherein the data in the encoded information is compressed by:

determining a probability density function associated with the authentication object;

determining vectors associated with the randomly distributed attributes based, at least in part, on the probability density function; and

encoding the vectors using an arithmetic coding algorithm;

wherein the label is self-authenticated by comparing the compressed data in the encoded information and the data representing the randomly distributed features obtained by analyzing the authentication ~~object.~~ object; and

wherein the compressed data was compressed by:

determining vectors associated with the randomly distributed features based, at least in part, on the probability density function; and

encoding the vectors using an arithmetic coding algorithm, wherein the algorithm comprises:

set U as a list of all unit areas in $S - S_i - u$.

list of all marked units, $M(u)$, is set to $M(u) = \varnothing$.

do

find all unit areas $V = \text{argmin}_{v \subset U} \| Q_v - Q_u \|$.

do

find unit area $w = \text{argmax}_{v \in V} \xi(1, v)$.

set AC range for w to $\gamma(w,u)$ (see Eqns.17,18).

set of nodes ordered before w is $M_w(u) = M(u)$.

$M(u) = M(u) \cup w$, $V = V - w$, $U = U - w$.

while $V \neq \varnothing$

while $U \neq \varnothing$.

23. (Cancel)

24. (Original) The label as recited in Claim 22, wherein encoded information is included in the label as a barcode.

25. (Original) The label as recited in Claim 22, wherein encoded information is encoded using a private key.

26. (Original) The label as recited in Claim 22, further comprising:

textual data that includes a string of characters, wherein the compressed data is encrypted using the textual data.

27. (Original) The label as recited in Claim 26, wherein compressed data is encrypted by:

hashing the textual data with an algorithm; and

encrypting the compressed data using the hashed textual data.

28. (Currently Amended) An apparatus comprising:

means for determining randomly distributed features in an authentication object;

means for determining a probability density function associated with the authentication object, wherein the probability density function defines a likelihood a point will contain an illuminated second end of a fiber and is conditioned on location of a first end of the fiber in an illuminated region;

means for compressing data representing the randomly distributed features, wherein the compressing is based in part on the probability density function;

means for encoding the data with a signature; and

means for creating a label that includes the authentication object and the encoded data.

29. (Original) The apparatus as recited in Claim 28, further comprising

means for incorporating fibers in the authentication object as the randomly distributed features.

30. (Previously Presented) The apparatus as recited in Claim 28, further comprising:

means for determining vectors associated with the randomly distributed features based, at least in part, on the probability density function; and

means for encoding the vectors using an arithmetic coding algorithm.

31. (Original) The method as recited in Claim 28, further comprising:

means for determining textual data that includes a string of characters;

means for hashing the textual data with an algorithm;

means for encrypting the compressed data using the hashed textual data; and

means for including the textual data in the label.

32. (Original) The apparatus as recited in Claim 28, further comprising:

means for authenticating the label by comparing encoded data with the data associated with the randomly distributed features in the authentication object.